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# SOUTHERN FOREST EXPERIMENT STATION



*A stand of slash pine developed under fire protection.*

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

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# THE SOUTHERN FOREST EXPERIMENT STATION

The Southern Forest Experiment Station, a regional research unit of the Forest Service, United States Department of Agriculture, serves the States of Florida, Georgia, Alabama, Mississippi, and Louisiana, the southern half of Arkansas, and the timbered regions of eastern Texas and Oklahoma. The station's headquarters are in New Orleans, La., but through a series of branch stations and experimental forests (the locations of which are shown on the map in the center of this folder), field investigations on various phases of forestry are conducted.<sup>1</sup>

The purposes of these investigations, which form part of a national program of forest research, are (1) To determine the basic facts underlying forest production and forest protection in the region; (2) to determine the most effective

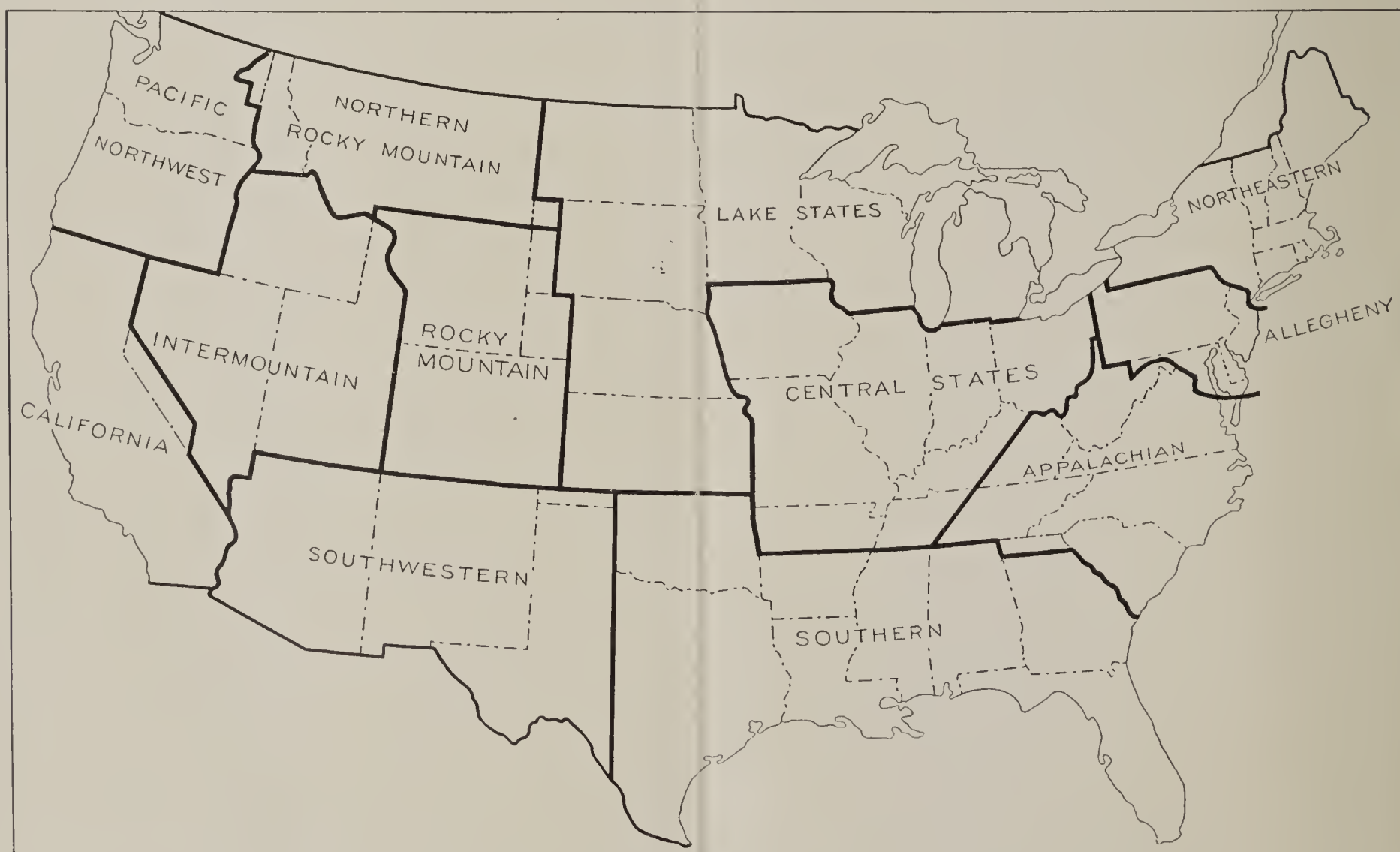
<sup>1</sup> A part of the southern forest region is served by the Appalachian Forest Experiment Station with headquarters at Asheville, N. C.

use of forests and other natural cover in regulating stream-flow and controlling erosion; and (3) to bring about the fullest and most profitable use of forest land.

This folder presents briefly some of the outstanding aspects of the station's activities. Further information upon any phase of the work will gladly be furnished on request.

In the Southern States, forests rank second only to agriculture in commercial importance. The total commercial forest land area of all of the 11 Southern States from Virginia to Texas is 191 million acres, or nearly 40 percent of the country's total. This area contains about 12 percent of the merchantable saw timber in the United States, a larger proportion than any other single forest region except the Pacific Northwest. More than one out of every three acres of forest land in the United States is in the South.

The large map in the center of this folder shows the principal types of forests in the region. These are longleaf-slash, shortleaf-loblolly, riverbottom hardwoods-cypress, and upland hardwoods. By far the most important trees in the Southern Station's territory are the four pines (1) Long-



Map showing regions served by the regional forest experiment stations.



*Second-growth loblolly pine 38 years of age.*

leaf, (2) shortleaf, (3) loblolly, and (4) slash. The distribution of these four species in the United States is shown at the lower left side of the large map.

## FOREST MANAGEMENT

The forest manager, instead of planting his crops annually as the farmer must, can often handle his crop, the forest, so that seed for new trees is disseminated naturally from trees of the old crop. When necessary, however, he produces the new crop in whole or in part by sowing seed in a nursery and planting the resulting seedlings where he desires to grow a forest. Like the farmer, the forester must care for his growing crop; must protect it from its enemies—fire, insects, and disease; and must handle the forest in such a way that he derives the maximum returns.

Forest-management research, which constitutes a large part of the station's activities, covers a broad field. It deals largely with the determination of the best way to encourage the natural reseeding of the most desirable species in the shortest period of time, thus insuring the prompt succession of an ample new forest crop. It also includes the study of methods of improving the growing forest through thinning young stands to accelerate the growth of the more promising trees, and through eliminating worthless, undesirable, diseased, and infested trees. By its efforts in the broad field of forest management, the Southern Forest Experiment Station

is developing the most effective methods for helping the forest to renew itself and for maintaining or increasing the yields and quality of timber and other forest products.

## FORESTATION

On many cut-over forest lands in the South no seed trees, or at least only a few, have been left to start a new crop, and where grass and other competitors of young trees hold back the scattered seedlings that appear, natural reproduction cannot be relied upon. The long course of years necessary to raise a forest crop from such slender beginnings would preclude meeting our immediate needs for forest products as well as providing a reasonable return on the owner's carrying charges. These barren tracts (especially areas formerly producing longleaf pine), denuded in heavy cuttings of the original timber by the smash and sweep of logs dragged in by steam skidders and by subsequent repeated uncontrolled fires, can be restored to productivity within a reasonable period only by planting. Nature often sows several million seeds to grow a hundred mature trees; for such prodigality the forester must substitute knowledge of where and what, when and how to sow and plant. Further, the forester can improve upon natural methods by careful selection of parent trees and by genetical crosses of desirable strains. At present he possesses this knowledge only partially. By research, the Southern Forest Experiment Station is building up a store of greatly needed information to answer these questions. New and improved methods of extracting pine seeds from cones and of storing them to prevent deterioration are being developed, and the growth possibilities of the seed are being tested. The station is also developing an efficient forest-nursery technique for producing large quantities of desirable seedlings at the lowest cost, and is studying the many and varied problems connected with the successful planting of seedlings under a wide variety of conditions.

## GROWTH AND YIELD OF TIMBER

To supply a basis for forest management designed to perpetuate the high-grade timber supplies both of southern pines and of bottom-land hardwoods, the Southern Forest Experiment Station is studying the potential yields of such stands on various sites and at varying ages. Information on the growth and yield of dense second-growth stands of the various southern pines has already been made available by the station in Miscellaneous Publication 50 of the United States Department of Agriculture, "Volume, Yield, and Stand Tables for Second-Growth Southern Pines." The growth rates of southern pines in open stands have yet to be determined. Comparatively little is yet known about the growth rate of the many hardwood species found in the bottom lands and overflow swamp lands throughout the South, with the possible exception of red gum.

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*Measuring a second-growth red gum tree to determine its volume.*

### NAVAL STORES

Pitch and tar obtained from longleaf and slash pines were among the earliest exports of the American colonies. Because they were used chiefly in waterproofing and calking wooden sailing vessels, these commodities were called "naval stores." Although very little of the turpentine and rosin now manufactured from resin, or "pine gum", as it is called locally, is now used for the original purpose, the name still clings to the industry. Old-growth stands of longleaf and slash pine timber have almost disappeared, and efficient methods of obtaining gum from second-growth stands must be perfected if the naval-stores industry is to prosper. Naval-stores experts on the staff of the Southern Forest Experiment Station are devising and developing improved methods of obtaining gum and of managing stands. While the primary purpose of these methods is to obtain the maxi-

mum yield of gum, they are designed also to preserve the trees turpentine so that this yield may be continued for a long time without either exhausting the gum supply or precluding the eventual use of the tree for lumber or other products.



*Gathering the crude gum from longleaf and slash pines, for distillation into turpentine and rosin.*

### FIRE STUDIES

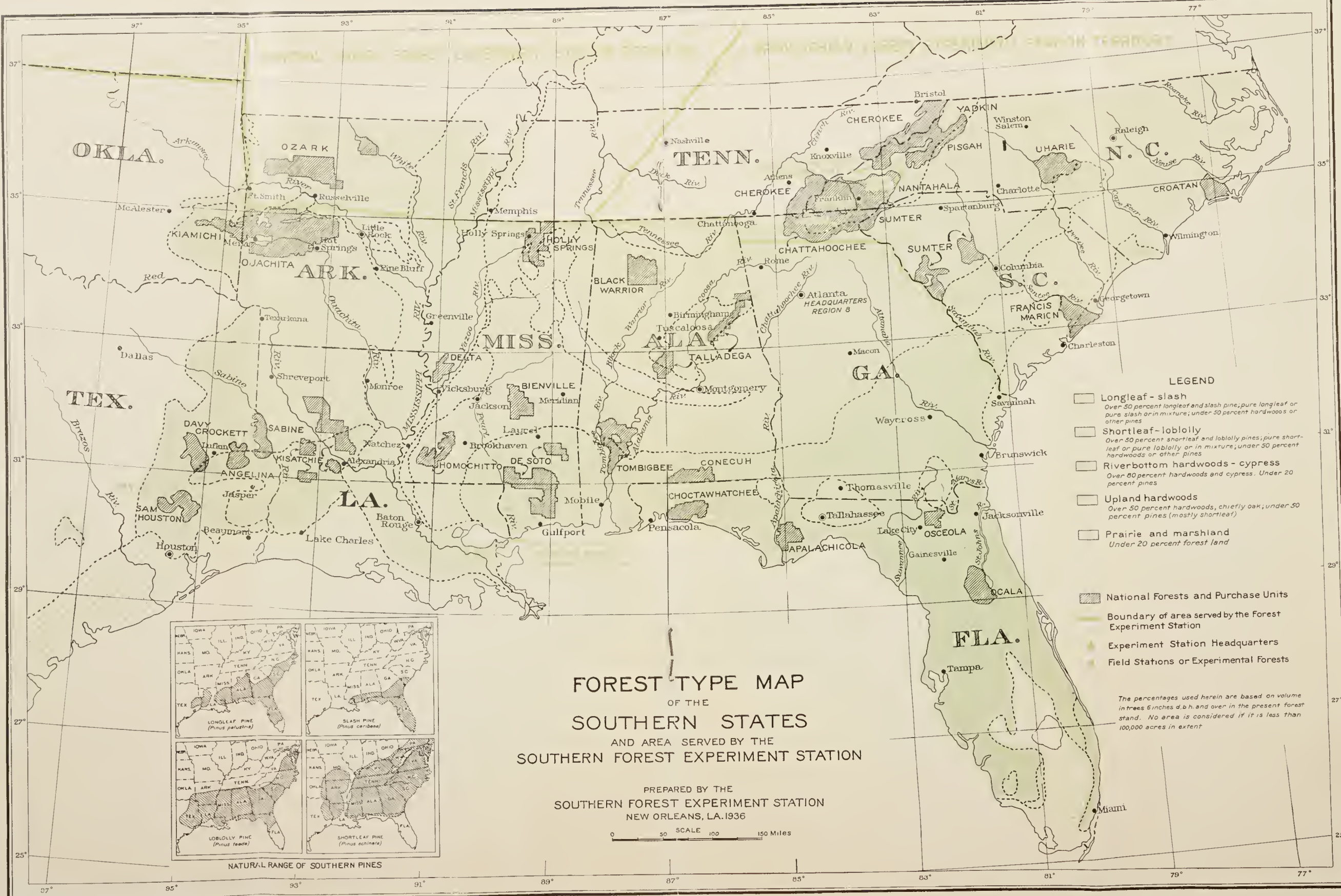
Of all the factors operating to destroy southern forests the most serious is fire. Control of fire is essential to the growing of timber crops in the South as in every other forested region of the world. Fire studies of the Southern Forest Experiment Station are making available basic information necessary to the solution of forest-fire problems of the South.

Pine trees that have been worked for turpentine are particularly susceptible to fire. The "faces", exposed by chip-













ping, are coated with gum and are highly inflammable. In addition to timber loss, fire in turpentine stands causes heavy losses in cups and gutters and, by destroying the protective covering on the faces, leaves the trees susceptible to attack by insects and fungi.



*A longleaf pine that is being turpentineed, showing the face, cup, and gutter.*

If properly controlled, fire may at times be a valuable tool. There is evidence of its usefulness in promoting natural reproduction of longleaf pine and lessening the hazard of heavy loss in times of drought and high winds. But not all species are as resistant to fire as is the longleaf pine—indeed, some of the valuable hardwood species are particularly susceptible to fire injury. The ill-advised and careless use of



*Fire in a 19-year-old stand of longleaf pine.*

fire, therefore, may result in great damage to timber and serious loss to the timber owner.

### TREE DISEASES, INSECT DAMAGE, AND FOREST WILDLIFE

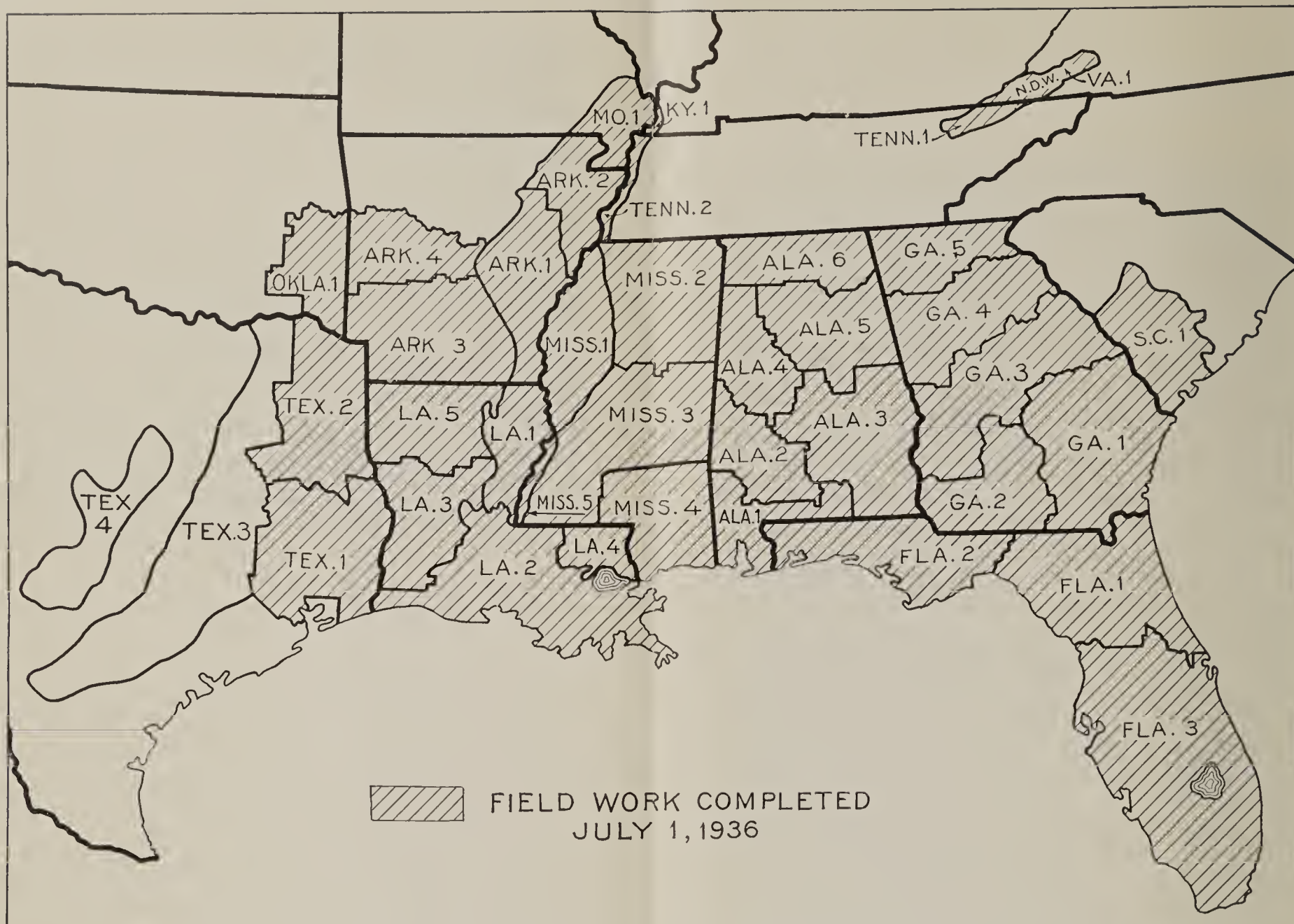
The Bureau of Plant Industry carries on cooperative research at the Southern Forest Experiment Station in pathology of forest trees and forest products, dealing mainly with fungus diseases. The Bureau of Entomology and Plant Quarantine cooperates in studies of insect damage and its prevention and suppression. The Bureau of Biological Survey is also cooperating with the station in studies of the habits of wildlife with particular attention to the control of damage to the forest.

Among the projects carried on by these investigators are efficient methods of controlling sap stains and molds in domestic and export lumber and logs; eradication or control of needle rusts and diseases of seedlings and young trees; suppression of various injurious insects operating in forest nurseries, plantations, or stands, as well as in forest products; and in methods of controlling damage by birds and rodents to tree seeds and young trees.

### FOREST INFLUENCE STUDIES

Land clearing in certain parts of the South frequently results in rapid run-off of rainfall and in a serious loss of arable land through abnormal washing, or erosion, of fertile topsoil and formation of deep gullies. Furthermore, rapid run-off from heavily cut-over and burned forest lands adds materially to flood problems of the lower Mississippi River. Experimental results at the Southern Forest Experiment Sta-





Map showing units of the Forest Survey in the South. (The unit designated as "N. D. W." is the Norris Dam Watershed.)

tion clearly show that maintenance of a full forest or other natural vegetative cover prevents destructive erosion and reduces run-off. Careful study is necessary to find how and under what conditions this protective cover can be best utilized, and what methods are most effective and economical for establishing a protective plant cover on lands now being eroded, and for managing forest lands on important drainages.

Tests on a small scale show that forests promote rapid absorption of precipitation and tend to regulate the flow of streams. They also show that even in advanced stages erosion can be effectively checked through construction of temporary check dams of brush, wire, and grass sod in the gully bottoms, followed by planting of young trees. Plowing along the tops of gully banks prior to planting has proved beneficial in stabilizing eroding land. Incipient gullying

has been checked on many areas by establishing a young forest stand. Of the many species of trees tried, black locust seems to be the most promising. Native pines are also proving effective, and grass and other minor vegetation has been found very useful in holding soil in place.

### THE "NEW PUBLIC DOMAIN"

The area of tax-delinquent land in the South that is being forfeited to public or pseudo-public ownership has become so large that it has been called "the new public domain." A large portion of this (approximately 20 million acres out of the 32-million-acre total) is forested. Removal of these lands from local tax rolls imposes a hardship on the citizens, who must consequently pay increased taxes or suffer marked reduction in public services received.





*An example of severely eroded land in northern Mississippi.*

To find a remedy for this situation forest economists at the Southern Forest Experiment Station are making studies of forest-land ownership, taxation of forests, tax delinquency, and the place of forests in the broad land-use program for the region.

### PRIVATE FORESTRY

The economic and social future of the South is dependent to a very large degree on the continued productivity of its forests, which occupy 73 percent of its total land area. These forests furnish saw logs for lumber, pulpwood for paper, gum for naval stores, and other raw forest materials necessary for the operation of forest industries, which provide employment for about one-fourth of all persons employed in all manufacturing industries in the South. In order to stabilize these industries and to assure permanent employment and incomes to 500,000 or more workers, as well as to stabilize the communities in which they live and to provide tax revenue for State and local governments, the commercial forests of the South must produce continuous supplies of raw material. This may be accomplished by sustained-yield management. To encourage private owners to adopt this form of forest management, the Southern Forest Experiment Station is furnishing them with definite figures on costs and returns as well as information as to the forestry practices involved.

### FOREST SURVEY

One of the regional organizations created by the United States Forest Service for a Nation-wide survey of timber re-



*The Forest Survey in virgin longleaf pine territory.*

sources has been functioning since January 1931 as a part of the Southern Forest Experiment Station. Its purpose is four-fold: (1) To inventory the present standing timber suitable for lumber, pulpwood, poles, posts, railroad ties, naval stores, and other forest products; (2) to ascertain at what rate the supply of timber suitable for each of these uses is being increased through growth; (3) to determine at what rate the supply of standing timber is being reduced through industrial and other uses; and (4) to determine, through analysis of timber inventory, growth, and use data, the measures necessary to insure continued production of forest resources and to furnish an economically sound basis of regional land and social planning. The region covered is divided into survey units of from 5 to 10 million acres each.

Field work on the regional timber inventory, which was completed on 220 million acres as of June 30, 1936, was done by crews consisting of three experienced timber cruisers each. These cruisers systematically gridironed the areas designated to be surveyed, and on quarter-acre sample plots taken every 660 feet along parallel compass lines 5 or 10 miles apart, carefully measured the trees, and recorded their number, size, volume, species, and rate of growth. Growth and depletion studies were made on each survey unit by crews of specialists in these subjects. In the naval-stores belt, a special economic study was made of turpentine and rosin production. Survey data are being assembled and analyzed, and as analysis is completed for each unit a preliminary report is published, to be followed later by complete State and regional reports.



## WORK AT THE BRANCH STATIONS AND EXPERIMENTAL FORESTS

The Southern Forest Experiment Station's experimental forests are the outdoor laboratories for forest research in the South. Located in national forests, these experimental areas are typical of forest conditions in their sections. On them are carried out as many projects as practicable.

The Olustee Experimental Forest, located at Olustee, Fla., 13 miles east of Lake City, in the heart of the naval-stores producing belt of the Southeast, is a good example of these experimental areas. This 3,000-acre tract, which was formally set aside from the Osceola National Forest on March 28, 1934, for research, is representative of some 30 million acres of longleaf and slash pine in the flatwoods region of north Florida and south Georgia. A group of headquarters buildings provides office, laboratory, greenhouse, workshop, and storage facilities for the research staff working on the problems of slash and longleaf pines. A resident forest ranger takes care of the area and protects it from fire. On a 10-acre block of the tract the Bureau of Chemistry and Soils of the United States Department of Agriculture has an experimental gum-handling and distillation plant.

If a fire breaks out on or near the area, it is reported as soon as sighted at the national forest lookout tower 3 miles away, and fire-fighting crews are immediately dispatched. A network of motorways and fire lines increases the chances for early suppression before a fire can burn over valuable experimental plots and ruin costly scientific instruments. A woven barbed-wire fence around the experimental area prevents the destruction of experiments by grazing or trampling of hogs or cattle. The forest has been intensively surveyed, and a soil- and forest-type map, as well as a detailed topographic map, has been prepared. This furnishes the basis for locating areas for specific experiments.

The Olustee Experimental Forest is devoted largely to the working out of new and improved methods of turpentine



*Entrance to the Olustee Experimental Forest.*



*Instruments for recording weather data on an experimental area.*

that will result in increased gum yields, reduced operating costs, and less damage to the trees. Details of proper management of naval-stores forests also receive attention. Other investigations include the effects of fire on the soil, on tree growth, and on the trees' products—gum and wood. Measured experimental plots are studied to determine the best methods of thinning young stands and of harvesting old stands. To augment the work in the forest certain fundamental and intensive studies are carried on at the headquarters laboratory and greenhouse. When a particular management practice or naval-stores technique has passed successfully from the laboratory and greenhouse stage through a small-scale trial under natural conditions on the experimental forest, it is then ready for a test of its practicability under semicommercial or commercial conditions on the adjacent 200,000 acres of the Osceola National Forest.





THE SOUTHERN FOREST EXPERIMENT STATION  
NEW ORLEANS, LA.



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